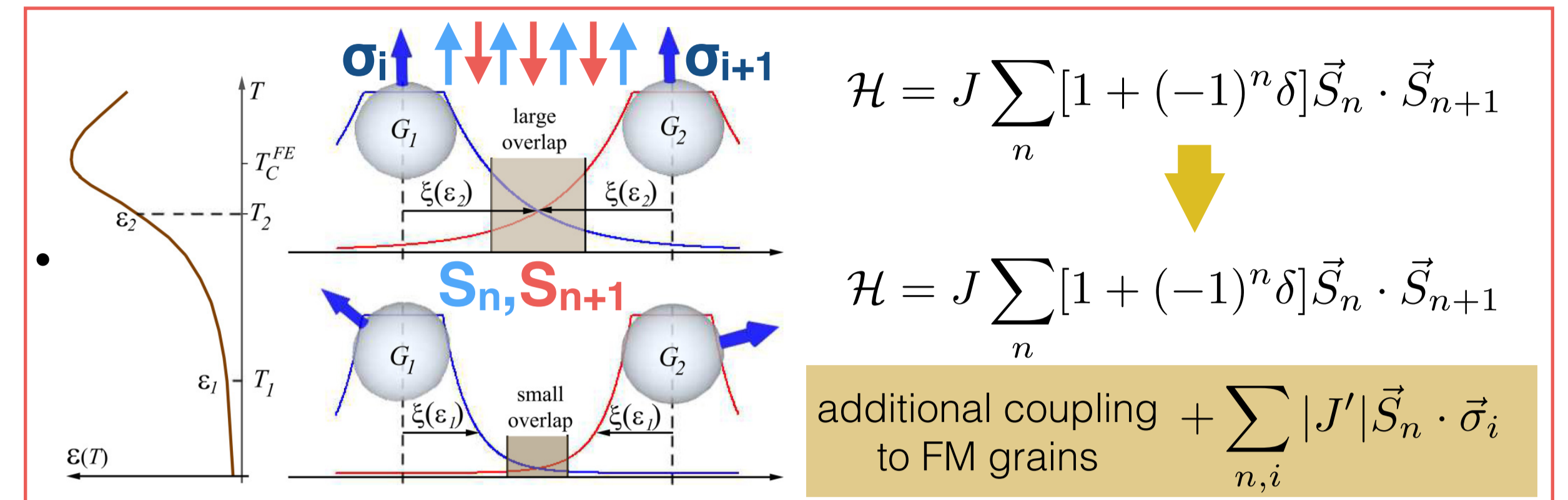


## Magnetic interactions in TTF-QCl4

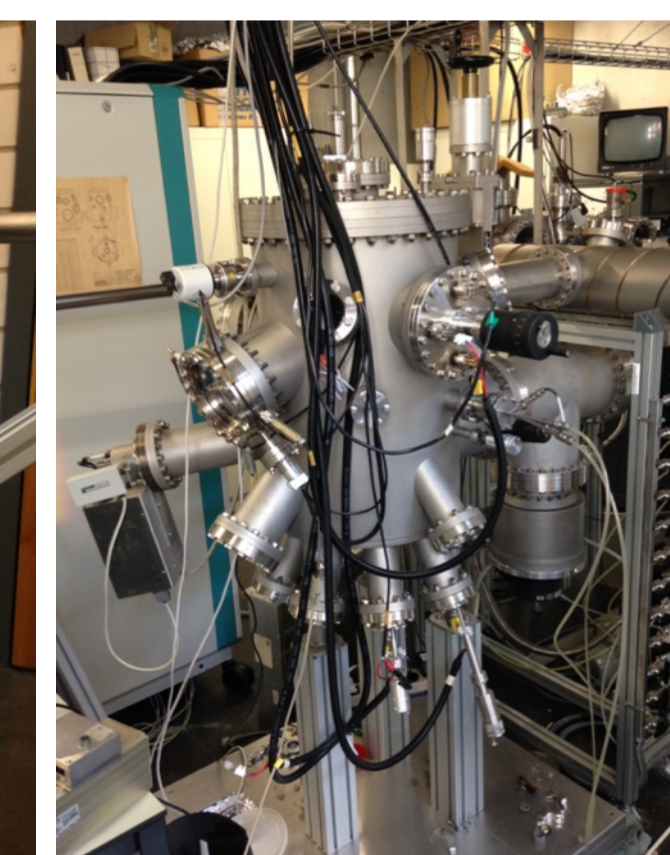
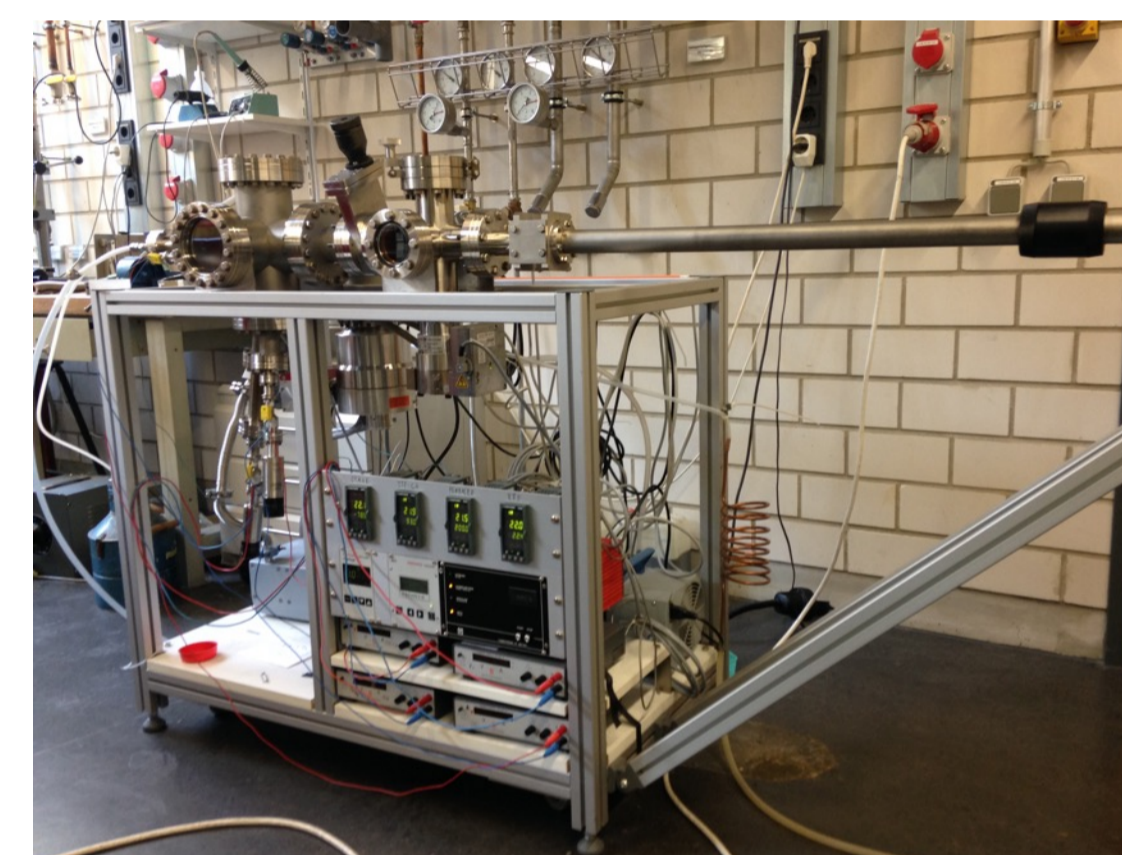
### Project goals and program



- Exchange-bias type coupling of TTF-QCl4 spins to ferromagnetic nano-dots in 2D lattice
- Magnetic field poling of magnetic dots → modified spin arrangement in TTF-QCl4 dimer stacks? Influence on ferroelectric state? Artificial multi-ferroic?

## Techniques

### Thin film growth and characterization

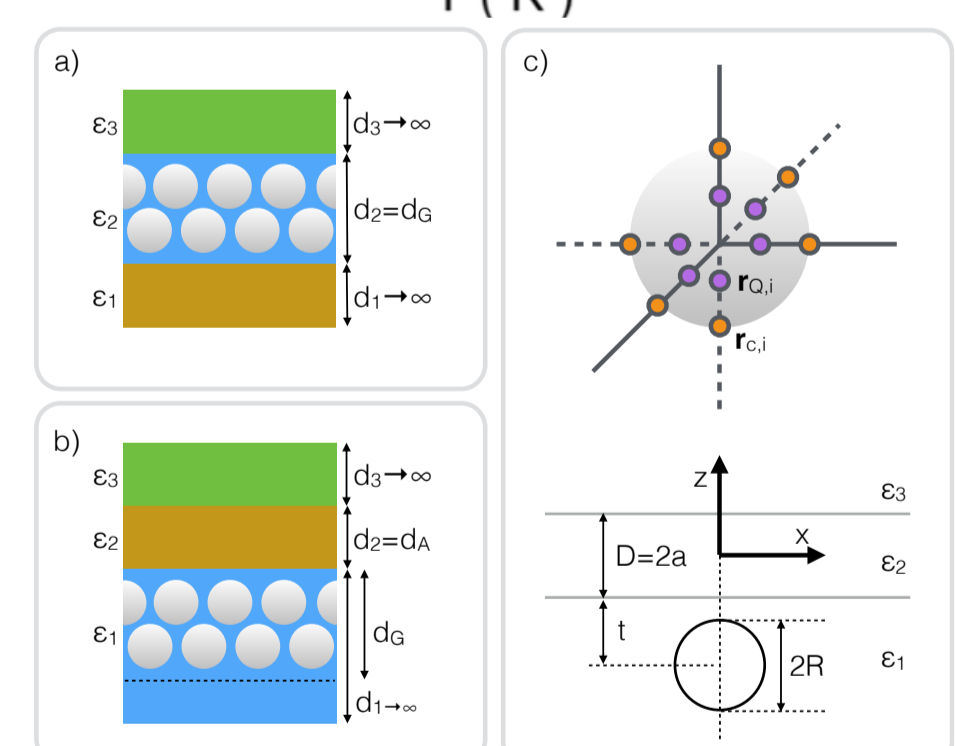
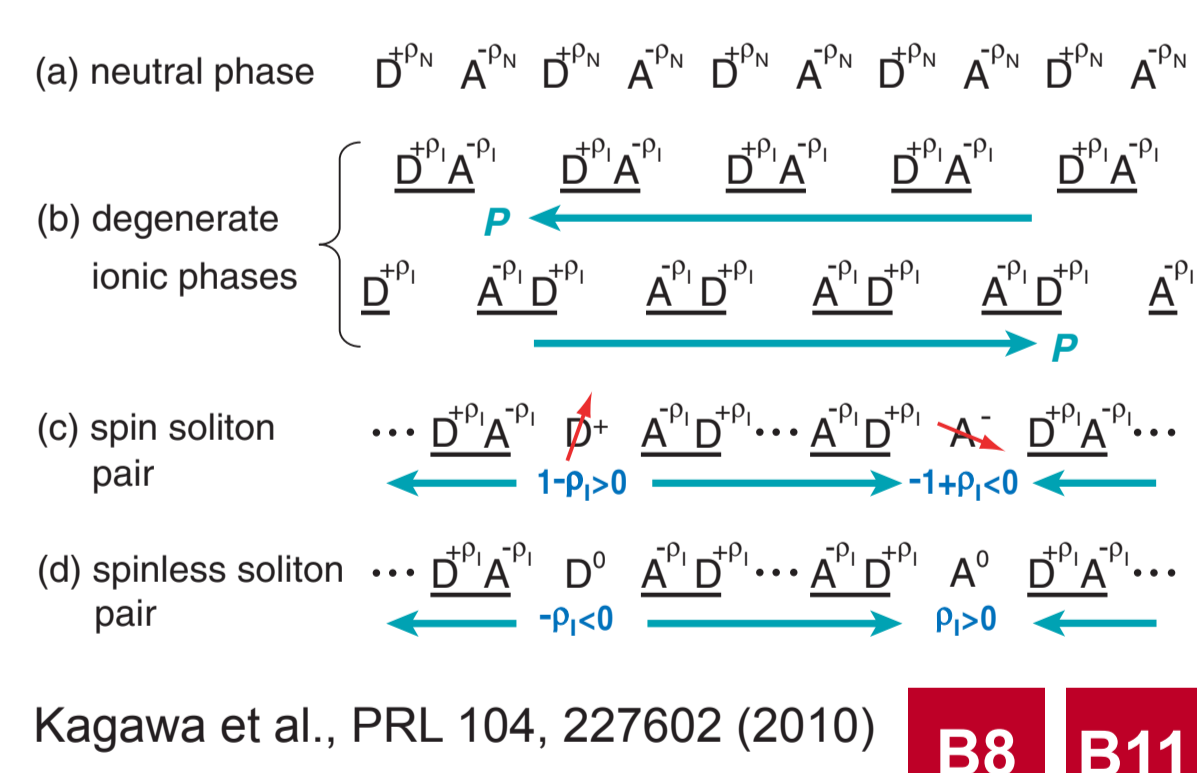
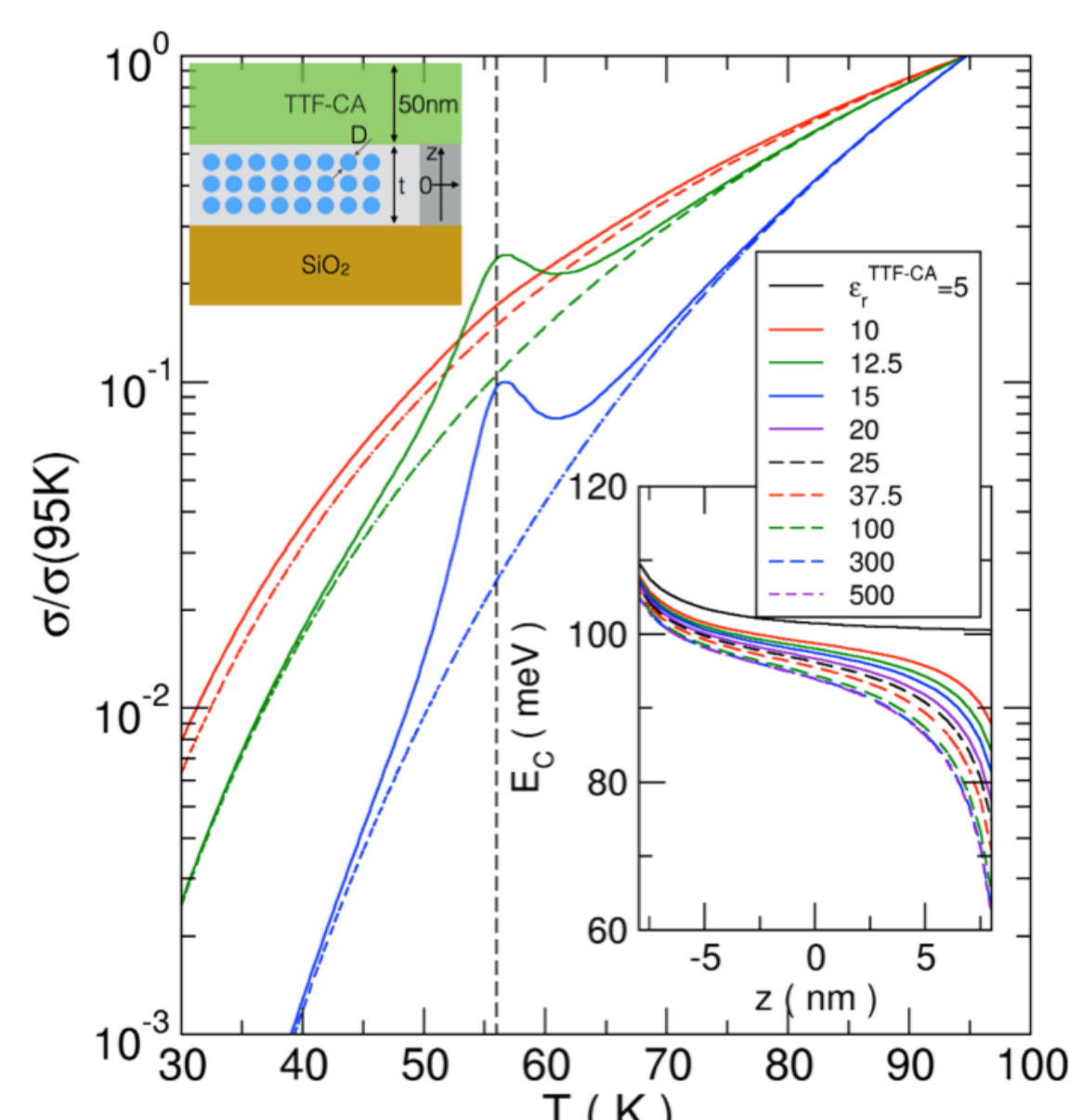


- 2 OMBD systems
- Multiple sources
- Cooling / heating stages
- X-ray diffractometer
- AFM

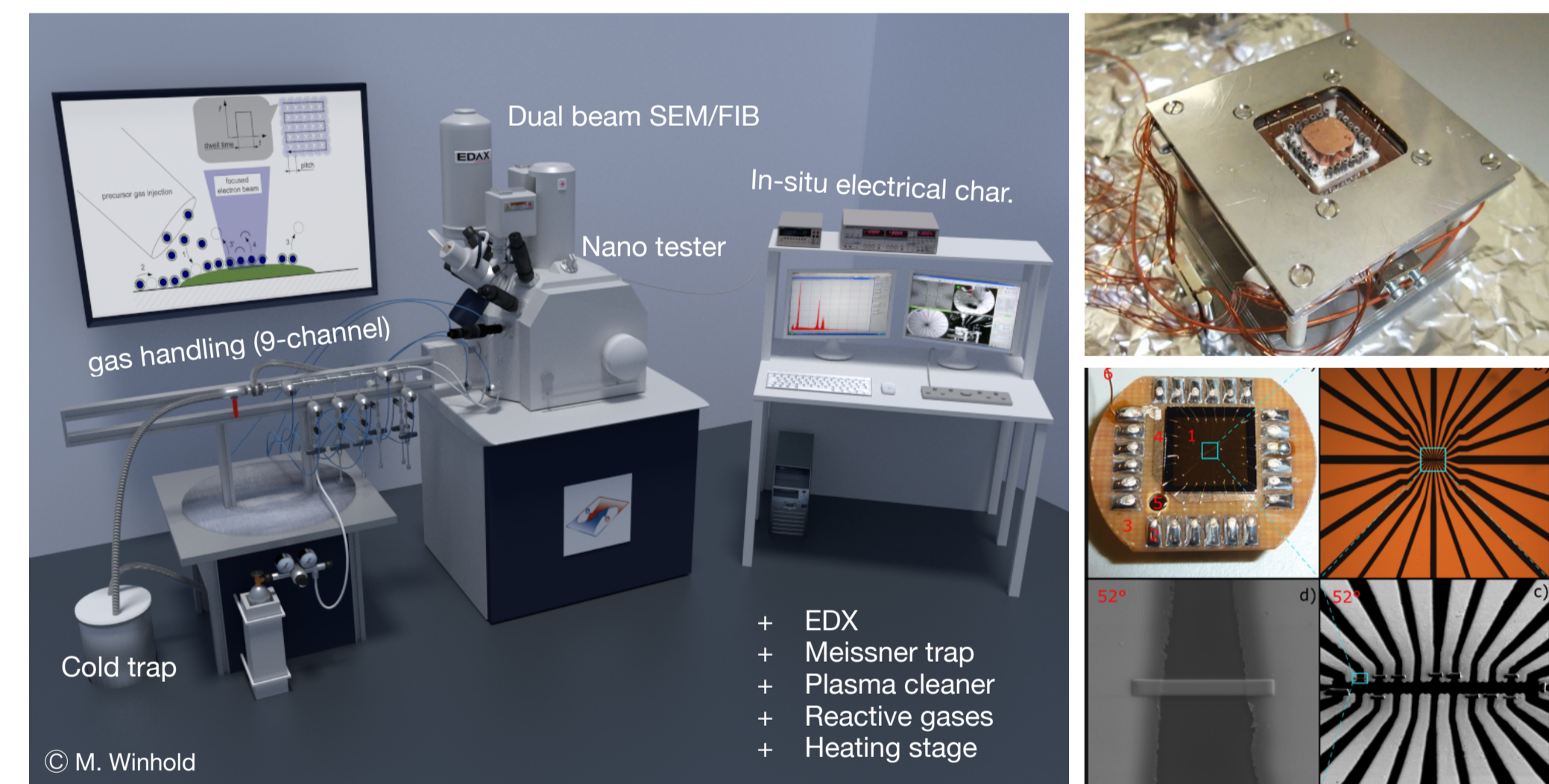
## TTF-QCl4 under anisotropic strain

### Project goals and program

- Influence of anisotropic strain on dimerization and charge transfer (→  $\epsilon_r(E;T)$ )
- Individual TTF-QCl4 growth domains (~500nm) by nano-patterning (→ anisotropy)
- Dynamics of charged domain walls (→ slow fluctuations in  $\epsilon_r$ )
- Influence of magnetic field on dielectric response

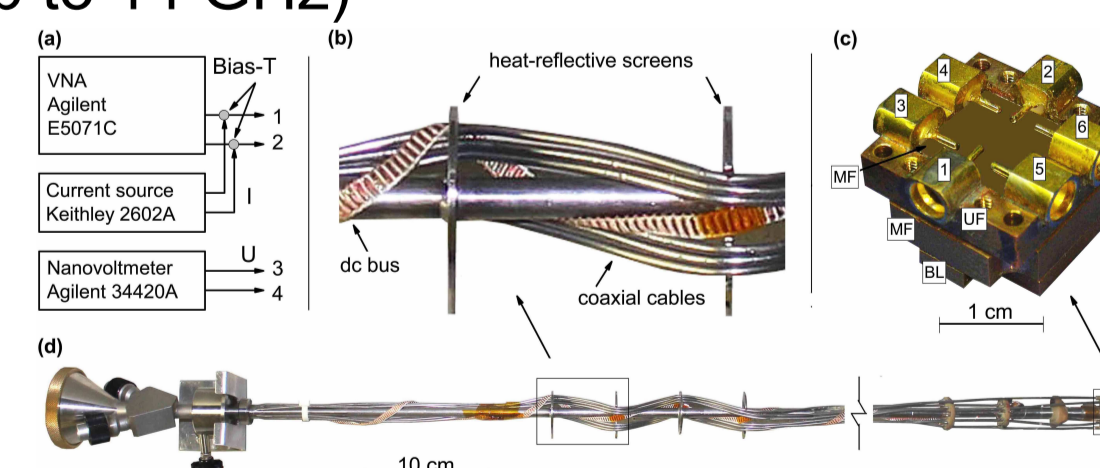


### Focused electron beam induced deposition



### Transport measurements

- $^4\text{He}$  and  $^3\text{He}$  cryo systems (1.5 - 300K, 12/14T; 0.3 - 80K, 9/11T)
- UV-lithography and clean room for contact preparation (AG Roskos)
- E-beam lithography (see dual beam SEM/FIB)
- S(T,B), R(T,B) (dc,ac); I(V), C(T)
- HF-measurement setup of strip line devices (up to 14 GHz)



### Job description of staff from requested funding

- NN (Ph.D. student)
- Preparation and characterization of TTF-QCl4 hybrid structures
  - (Magneto-) Conductance measurements on hybrid structures
  - Extraction of dielectric properties of TTF-QCl4 using model calculations
  - Measurement and analysis of slow conductance fluctuations and extraction of corresponding dielectric fluctuations

## Charge tunneling through TTF-QCl4

### Project goals and program

- TTF-QCl4 as matrix in metallic 2D nano-dot lattices → charged domain walls as background charges ⇒  $E_c$  renormalization
- Field-poling control of domain wall density
- Internal vs. switching field

